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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/699,354

10/31/2003

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08/13/2007

EXAMINER

AFZALI, SARANG

ART UNIT

PAPER NUMBER

3726

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/699,354

Applicant(s)

BENETEAU ET AL.

Examiner

Sarang Afzali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 6/19/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 8-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/19/2007 has been entered.

Response to Amendment

2. The applicant's amendment filed on 5/21/2007 has been fully considered and made of record.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1, lines 3-5, recites the newly added limitation "determining a **maximum chord reduction limit**; determining a portion of titanium alloy material to be removed based on the **determined maximum chord reduction limit**." It is not clear what

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exactly the maximum chord reduction limit is and how it is determined and how it could be used to determine a portion of titanium alloy material to be removed along the leading and trailing edges of the airfoil.

The specification (paragraph [0017], lines 7-11) discloses that "... if a rotor blade 10 appears to include damaged and/or deteriorated portions 48, measurements are take(n) to determine if pre-established reparability conditions have been satisfied. In one embodiment, **reparability limits** are based on a minimum blade thickness T and a **maximum chord reduction** which, in the exemplary embodiment, is approximately five percent of the chord." Furthermore, the specification (paragraph [0015], lines 8-10) discloses that "A chord of airfoil 20 is defined as a line between leading edge 34 and trailing edge 36 at each cross section of airfoil 20."

Thus, one can conclude that the reparability limit is determined as a ratio of the thickness and the maximum chord reduction however there is no explicit/implicit disclosure of what the maximum chord reduction is and how it can be determined/measured in order to determine the damaged portion of titanium alloy material needed to be removed.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-7, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Randolph Jr. et al. (U.S. 6,453,211) in view of Applicant's Admitted Prior Art (AAPA) and further in view of Burke et al. (US 6,508,000).

8. As applied to claim 1, Randolph Jr. et al. teach a method of repairing a damaged gas turbine blade comprising of the steps:

removing titanium alloy material from along leading and trailing edges of the airfoil, and along a radially outer tip of the airfoil to form respective leading edge and trailing edge, with each define cut-back depths;

depositing titanium weld material onto the leading edge and trailing edge cut-backs; and

removing at least some of the titanium weld material to obtain pre-desired finished dimensions for the leading and trailing edges.

Note that Randolph Jr. et al. teaches (Fig. 3 and col. 2, lines 14-29 and col. 9, lines 44-54) the three steps of invention cited including first step of removing titanium material from the damaged area of the leading edge (42) of each blade (12b), second step of depositing titanium weld material onto the leading edge (42) of each blade (12b), and third step of removing at least some of the titanium weld material to obtain a desired finish for each blade (12b) and further teaches that the same procedure can be made on the trailing edge (44, Fig. 3, col. 9, lines 44-46) of each blade (12b).

Randolph Jr. et al. fails to explicitly teach the repair done on "a radially outer tip of the airfoil" or the first two "determining" steps claimed.

AAPA teach a known method of repairing a turbine compressor blade including mechanically removing, such as by grinding a worn and/or damaged tip area and then adding a material deposit to the tip to form the tip to a desired dimension (paragraph [0005], lines 1-8). Note that the grinding step would make a cut-back in the tip area by removing the damaged portion.

Burke et al. teach a method of repairing a damaged gas turbine engine component such as an airfoil blade (18, Fig. 6) wherein depending on the severity of the damaged area, either a full length or only localized/partial sections are replaced/repared (col. 11, lines 5-11 and 27-32). Also, note that Burke et al. teach the repair is not only done on the damaged leading and trailing edges but also on the tip area extended from the leading edge to the trailing edge of the blade airfoil (col. 12, lines 13-15, Fig. 5).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Randolph Jr. et al. with the repair of the outer tip portion as taught by AAPA including the necessary length and size of the repair as taught by Burke et al., in order to provide an effective way of replacing a worn or damaged tip area of a compressor blade.

It would have been further obvious to one of ordinary skill in the art at the time of invention to have provided Randolph Jr. et al./AAPA/Burke et al. with the steps of measuring and determining the damaged area on the airfoil, comparing it with the pre-damaged areas, and determining the extensiveness of the repair needed in order to remove the damaged portion and provide the repair on the damaged portion based on

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the determined information in order to obtain a desired finish for each blade that would match the pre-damaged profile of the airfoil.

9. As applied to claim 2, Randolph Jr. et al./AAPA/Burke et. teach a method wherein removing titanium alloy material further comprises machining away titanium alloy material along only the radially outermost portions of the leading and trailing edges extending from the tip towards a base of the airfoil (Fig. 3).

10. As applied to claim 3, Randolph Jr. et al./AAPA/Burke et al. teach a method wherein machining away titanium alloy material along only the radially outermost portions of the leading and trailing edges further comprises forming a rounded corner between the leading edge and trailing edge cut-backs and un-machined portions of the airfoil extending between the leading and trailing edge outermost portions and the base of the airfoil (Fig. 3).

11. As applied to claim 4, Randolph Jr. et al./AAPA/Burke et al. teach a method wherein forming a rounded corner between the leading edge and trailing edge cut-backs and un-machined portions of the airfoil further comprises forming a semi-circular corner that has a predetermined arc and radius of curvature (Fig. 3).

12. As applied to claim 5, Randolph Jr. et al./AAPA/Burke et al. teach a method wherein machining away titanium alloy material along only the radially outermost portions of the leading and trailing edges further comprises machining away titanium alloy material along a length of about half a span of the airfoil between the tip and the base of the airfoil (Fig. 3).

13. As applied to claim 6, Randolph Jr. et al./AAPA/Burke et al. teach a method wherein machining away titanium alloy material along only the radially outermost portions of the leading and trailing edges further comprises blending the titanium weld material (Fig. 3).

14. As applied to claim 7, Randolph Jr. et al./AAPA/Burke et al. teach a method wherein machining away titanium alloy material along only the radially outermost portions of the leading and trailing edges further comprises contouring the leading edge (Fig. 3).

Response to Arguments

15. Applicant's arguments with respect to claims 1-7 in a reply dated 5/21/2007 have been considered but they are not persuasive.

16. Applicant's submission of terminal disclaimer is accepted and therefore, the obviousness-type double patenting rejection of claims 1-7 over US 6,532,656 in view of Randolph et al. is withdrawn.

17. As for claims 1-7, rejected under 35 USC 103(a) as being unpatentable over Randolph Jr. et al. in view of AAPA and further in view of Burke et al., Applicant mainly argues ("Remarks", page 2, paragraph 3) that "None of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method of repairing a gas turbine engine compressor blade airfoil as recited in Claim 1. More specifically, none of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method that includes determining a maximum chord reduction limit. Furthermore,

none of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method that includes determining a portion of titanium alloy material to be removed based on a determined maximum chord reduction limit."

Note that the abovementioned limitation is presently amended into the claim 7 and was not considered in the rejection of claims as outlined in the last office action mailed on 3/19/2007. But never the less, there is no explicit/implicit disclosure of what the maximum chord reduction is and how it can be determined/measured in order to determine the damaged portion of titanium alloy material needed to be removed.

Applicant argues that none of the prior art "considered alone or in combination, describes or suggests a method that includes, depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs" ("Remarks", page 3, paragraph 1, lines 1-3) and further argues that "Applicants respectfully submit that the Section 103 rejection of Claims 1- 7 is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been obvious to one of ordinary skill in the art to modify the weld repairing of Randolph with the material removal and replacement of AAPA and with the transient liquid bonded insert of Burke to arrive at the present invention. " and goes on to cite case laws for support.

The Examiner respectfully disagrees with the above arguments.

Note that Randolph Jr. et al. teaches (Fig. 3 and col. 2, lines 14-29 and col. 9, lines 44-54) the steps of invention cited including step of removing titanium material from the damaged area of the leading edge (42) of each blade (12b), step of depositing titanium weld material onto the leading edge (42) of each blade (12b), and step of

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removing at least some of the titanium weld material to obtain a desired finish for each blade (12b) and further teaches that the same procedure can be made on the trailing edge (44, Fig. 3, col. 9, lines 44-46) of each blade (12b).

AAPA is only relied upon to show that it is well known in the art to remove a damaged area of the tip and then adding material deposit to the tip and Burke is only relied upon to teach that it is well known in the art to repair/replace a full length or only localized/partial sections on leading, trailing and tip areas of an airfoil.

As such, there is valid motivation, suggestion and teaching of the desirability of making the specific combination.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarang Afzali whose telephone number is 571-272-8412. The examiner can normally be reached on 7:00-3:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on 571-272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

S.A.
8/1/2007



DAVID P. BRYANT
SUPERVISORY PATENT EXAMINER

8/3/07